Amendments to the Claims

The following Listing of Claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (previously presented): A method, comprising:

determining a correlation matrix (Cor) from color values of a color digital image;

ascertaining a correlation matrix (Cor_{NN}) of noise in the image;

calculating a new color conversion matrix C_{NEW} in accordance with $C_{NEW} = C_{NOMINAL}(Cor - Cor_{NN})^T(Cor^{-1})^T$, where $C_{NOMINAL}$ is a nominal color conversion matrix; and

color converting the color values of the image by applying the new color conversion matrix C_{NEW} to the color values.

Claim 2 (previously presented): The method of claim 1, further comprising dividing the image into a plurality of image areas.

Claim 3 (previously presented): The method of claim 2, wherein:

the ascertaining comprises ascertaining for each image area j a respective correlation matrix $Cor_{NN}(j)$ comprising values of noise variation determined for the respective image area j.

Claim 4 (previously presented): The method of claim 2, wherein:

the determining comprises determining for each image area j a respective correlation matrix Cor(j) having values derived from color values in the respective image area j.

Claim 5 (previously presented): The method of claim 1, wherein the determining, ascertaining, calculating, and color converting are performed on color values of the image in three or more color channels.

Claim 6 (previously presented): The method of claim 2, wherein:

the dividing comprises grouping pixels of the image into the image areas based on local statistics determined from the color values of the image.

Claim 7 (previously presented): The method of claim 2, wherein:

the dividing comprises grouping pixels of the image into the image areas in accordance with a clustering process or a vector quantization process applied to the color values of the image.

Claim 8 (previously presented): The method of claim 2, wherein:

the calculating comprises calculating for each image area j a respective new color conversion matrix $C_{NEW}(j)$ based on the nominal color conversion matrix $C_{NOMINAL}$ or the respective new color conversion matrix $C_{NEW}(k)$ calculated for an image area k adjacent the image area j.

Claim 9 (canceled).

Claim 10 (currently amended): ~~The method of claim 9,~~ A method, comprising:

dividing a color digital image into a plurality of image areas;

for each of the image areas, calculating a respective color conversion matrix based on the color values of the image area wherein:

the calculating comprises, for each image area j, calculating a respective color conversion matrix $C_{NEW}(j)$ in accordance with

$$C_{NEW}(j) = C_{NOMINAL}(Cor(j) - Cor_{NN}(j))^T(Cor^{-1}(j))^T$$

wherein $C_{NOMINAL}$ is a nominal color conversion matrix, each of the $Cor(j)$ is a respective correlation matrix determined from color values of the image area j, and each of the $Cor_{NN}(j)$ is a respective correlation matrix of noise in the image area j; and

color converting each of the image areas by applying the respective color conversion matrix to color values of the image area.

Claim 11 (previously presented): The method of claim 10, wherein:

prior to the color converting, each image area j has color values ($R_{j,raw}$ $G_{j,raw}$ $B_{j,raw}$) in a red, green, blue color space.

Claim 12 (canceled)

Claim 13 (previously presented): The method of claim 11, wherein:
each color correlation matrix Cor(j) is determined in accordance with

$$Cor(j)=\frac{1}{N_j}\begin{bmatrix}\sum_{i=1}^{N_j}R_{j,raw}(i)\cdot R_{j,raw}(i) & \sum_{i=1}^{N_j}R_{j,raw}(i)\cdot G_{j,raw}(i) & \sum_{i=1}^{N_j}R_{j,raw}(i)\cdot B_{j,raw}(i)\\ \sum_{i=1}^{N_j}R_{j,raw}(i)\cdot G_{j,raw}(i) & \sum_{i=1}^{N_j}G_{j,raw}(i)\cdot G_{j,raw}(i) & \sum_{i=1}^{N_j}G_{j,raw}(i)\cdot B_{j,raw}(i)\\ \sum_{i=1}^{N_j}R_{j,raw}(i)\cdot B_{j,raw}(i) & \sum_{i=1}^{N_j}G_{j,raw}(i)\cdot B_{j,raw}(i) & \sum_{i=1}^{N_j}B_{j,raw}(i)\cdot B_{j,raw}(i)\end{bmatrix}$$

where i is the pixel position in the image area j, and N_j is a respective total number of pixels in the image area j.

Claim 14 (previously presented): The method of claim 11, wherein:
each correlation matrix $Cor_{NN}(j)$ is determined in accordance with

$$Cor_{NN}(j)=\begin{bmatrix}\sigma_R^2(j) & 0 & 0\\ 0 & \sigma_G^2(j) & 0\\ 0 & 0 & \sigma_B^2(j)\end{bmatrix}$$

where, for said pixel group, $\sigma_R(j)$ is a standard deviation of noise value in the red color channel of image area j, $\sigma_G(j)$ is a standard deviation of noise value in the green color channel of image area j, and $\sigma_B(j)$ is a standard deviation of noise value in the blue color channel of image area j.

Claim 15 (previously presented): The method of claim 10, further comprising calculating the nominal color conversion matrix $C_{NOMINAL}$ by minimizing the sum of a squared [-] difference between a spectral sensitivity function of color values in the color-converted image area and a standard color space.

Claim 16 (canceled)

Claim 17 (previously presented): The method of claim 10, wherein:

prior to the color converting, each image area j has color values in a four-channel color space.

Claims 18-20 (canceled)

Claim 21 (previously presented): The method of claim 1, wherein the color converting comprises applying the new color conversion matrix C_{NEW} to all the color values in only a portion of the image.

Claim 22 (previously presented): The method of claim 1, wherein the color converting comprises applying the new color conversion matrix C_{NEW} to all the color values of the image.

Claim 23 (previously presented): A system, comprising:

a memory storing a color digital image; and

a processing system operable to:

determine a correlation matrix (Cor) from color values of the image;

ascertain a correlation matrix (Cor_{NN}) of noise values in the image;

calculate a new color conversion matrix C_{NEW} in accordance with

$C_{NEW} = C_{NOMINAL}(Cor - Cor_{NN})^{T}(Cor^{-1})^{T}$, where $C_{NOMINAL}$ is a nominal color conversion matrix; and

color convert the color values of the image by applying the new color conversion matrix C_{NEW} to the color values.

Claim 24 (previously presented): The system of claim 23, wherein the processing system additionally is operable to:

divide the image into a plurality of image areas;

ascertain for each image area j a respective correlation matrix $Cor_{NN}(j)$ comprising values of noise variation determined for the respective image area j; and

determine for each image area j a respective correlation matrix Cor(j) having values derived from color values in the respective image area j.

Claim 25 (currently amended): A system, comprising:

a memory storing a color digital image; and

a processing system operable to:

divide the image into a plurality of image areas;

for each of the image areas, calculate a respective color conversion matrix based on the color values of the image area, wherein, for each image area j, the processing system is operable to calculate a respective color conversion matrix $C_{NEW}(j)$ in accordance with .

$$C_{NEW}(j) = C_{NOMINAL}(Cor(j) - Cor_{NN}(j))^T(Cor^{-1}(j))^T$$

wherein $C_{NOMINAL}$ is a nominal color conversion matrix, each of the Cor(j) is a respective correlation matrix determined from color values of the image area j, and each of the $Cor_{NN}(j)$ is a respective correlation matrix of noise in the image area j; and

color convert each of the image areas by applying the respective color conversion matrix to color values of the image area.

Claim 26 (canceled).